Harmonization of HPV vaccination age recommendations for females and males

Background and Considerations

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Advisory Committee on Immunization Practices
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Overview

- Current recommendations for HPV vaccination
- History of ACIP policy for HPV vaccination of males
- ACIP Workgroup considerations for harmonization of age recommendations for males and females (through age 26 years)

Current age recommendations for HPV vaccination in the United States

- **Routine (for females and males)**
  - Age 11 or 12 years
  - Series can be started beginning at age 9 years
- **Persons not previously vaccinated (catch-up)**
  - Females through **age 26 years**
  - Males through **age 21 years**
    - Males 22 through 26 years may be vaccinated
  - Males 22 through 26 years with immunocompromising conditions (including HIV), who are transgender, and who have sex with men*

MMWR 2014;63 (RR05); MMWR 2015;64

*including men who identify as gay or bisexual, or who intend to have sex with men

2018 Adult Immunization Schedule

Figure 1

https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf

Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

Vaccine	19–21 years	22–26 years	27–49 years	50–64 years	≥65 years
Influenza[1]	1 dose annually				
Tdap[2] or Td[2]	1 dose Tdap, then Td booster every 10 yrs				
MMR[3]	1 or 2 doses depending on indication (if born in 1957 or later)				
VAR[4]	2 doses				
RZV[5] (preferred)				2 doses RZV (preferred)	
or				or	
ZVL[5]					1 dose ZVL
HPV–Female[6]	2 or 3 doses depending on age at series initiation				
HPV–Male[6]	2 or 3 doses depending on age at series initiation				
PCV13[7]	1 dose				
PPSV23[7]	1 or 2 doses depending on indication				1 dose
HepA[8]	2 or 3 doses depending on vaccine				
HepB[9]	3 doses				
MenACWY[10]	1 or 2 doses depending on indication, then booster every 5 yrs if risk remains				
MenB[10]	2 or 3 doses depending on vaccine				
Hib[11]	1 or 3 doses depending on indication				

Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection

Recommended for adults with other indications

No recommendation

2018 Adult Immunization Schedule

Figure 2

https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf

Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018

This figure should be reviewed with the accompanying footnotes. This figure and the footnotes describe indications for which vaccines, if not previously administered, should be administered unless noted otherwise.

Vaccine	Pregnancy[1-6]	Immuno-compromised (excluding HIV infection)[3-7,11]	HIV infection CD4+ count (cells/μL)[3-7,9-10]		Asplenia, complement deficiencies[7,10,11]	End-stage renal disease, on hemodialysis[7,9]	Heart or lung disease, alcoholism[7]	Chronic liver disease[7-9]	Diabetes[7,9]	Health care personnel[3,4,9]	Men who have sex with men[6,8,9]
			<200	≥200							
Influenza[1]	1 dose annually										
Tdap[2] or Td[2]	1 dose Tdap each pregnancy	1 dose Tdap, then Td booster every 10 yrs									
MMR[3]	contraindicated			1 or 2 doses depending on indication							
VAR[4]	contraindicated			2 doses							
RZV[5] (preferred)				2 doses RZV at age ≥50 yrs (preferred)							
or				or							
ZVL[5]	contraindicated			1 dose ZVL at age ≥60 yrs							
HPV–Female[6]		3 doses through age 26 yrs		2 or 3 doses through age 26 yrs							
HPV–Male[6]		3 doses through age 26 yrs		2 or 3 doses through age 21 yrs							2 or 3 doses through age 26 yrs
PCV13[7]		1 dose									
PPSV23[7]		1, 2, or 3 doses depending on indication									
HepA[8]		2 or 3 doses depending on vaccine									
HepB[9]		3 doses									
MenACWY[10]		1 or 2 doses depending on indication , then booster every 5 yrs if risk remains									
MenB[10]		2 or 3 doses depending on vaccine									
Hib[11]		3 doses HSCT recipients only		1 dose							

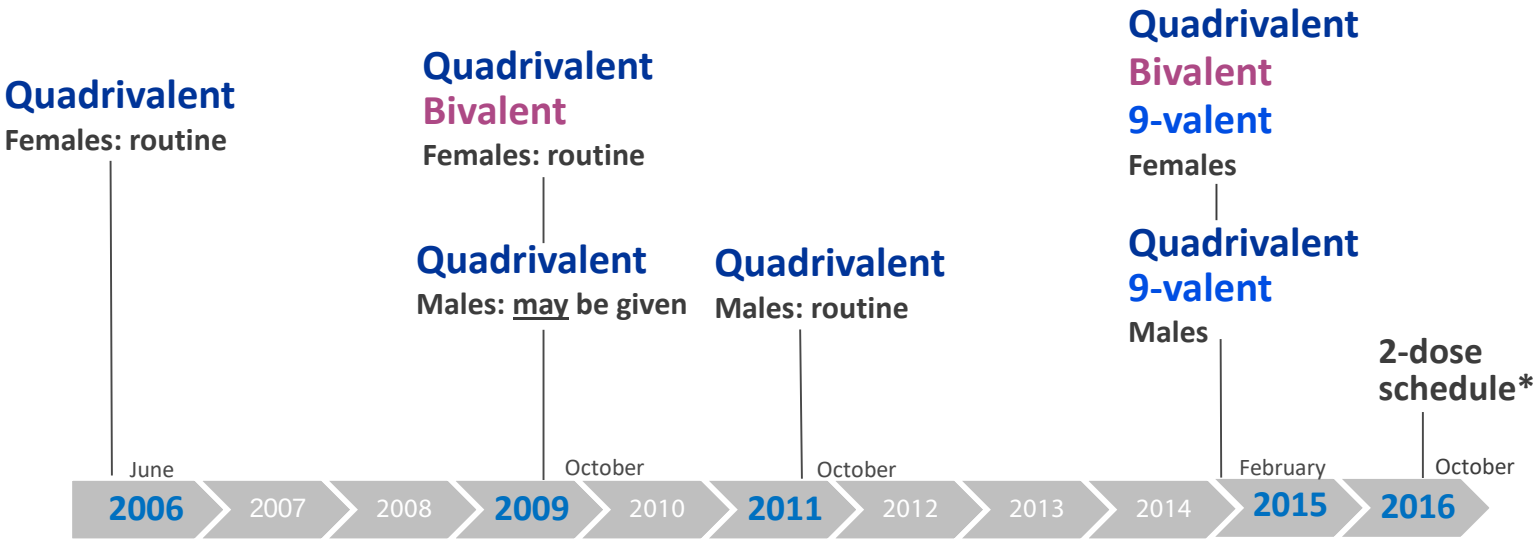
Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection

Recommended for adults with other indications

Contraindicated

No recommendation

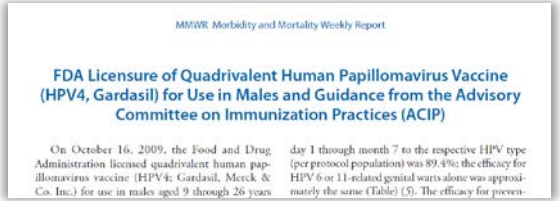
Evolution of ACIP recommendations for HPV vaccination in the United States



*For persons starting vaccination at age 9 through 14 years

ACIP considerations for HPV vaccination of males, 2009

- **FDA licensed quadrivalent HPV vaccine for use in males aged 9 through 26 years for prevention of anogenital warts in 2009**
  - Based on data from clinical trial in males; endpoint was anogenital warts
  - Clinical trial was ongoing to evaluate efficacy against anal precancers in males
- **ACIP reviewed data and considered recommendations**
  - Wanted to wait for efficacy data against anal precancers in males
  - Uncertainty about impact and cost effectiveness
  - Guidance: quadrivalent vaccine may be given to males aged 9 through 26 years



MMWR Morbidity and Mortality Weekly Report

FDA Licensure of Quadrivalent Human Papillomavirus Vaccine (HPV4, Gardasil) for Use in Males and Guidance from the Advisory Committee on Immunization Practices (ACIP)

On October 16, 2009, the Food and Drug Administration licensed quadrivalent human papillomavirus vaccine (HPV4; Gardasil, Merck & Co. Inc.) for use in males aged 9 through 26 years

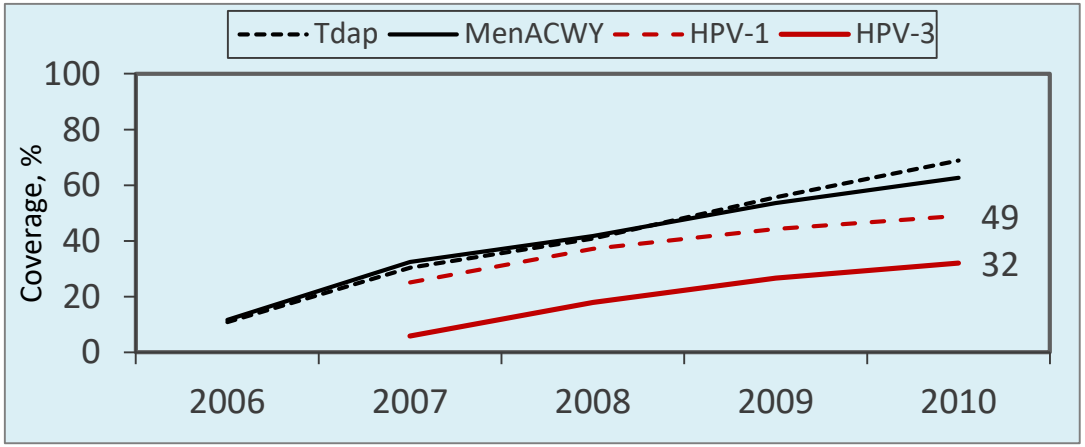
day 1 through month 7 to the respective HPV type (per protocol population) was 89.4%; the efficacy for HPV 6 or 11-related genital warts alone was approximately the same (Table) (5). The efficacy for preven-

MMWR 2010;59

FDA, Food and Drug Administration

ACIP considerations for HPV vaccination of males, 2011

- **FDA added prevention of anal cancer in males and females as an indication**
  - December 2010 - after review of results from clinical trial in males*
- **HPV vaccination coverage in adolescent females continued to be low**



Vaccination coverage among adolescents and HPV vaccine among females, 13–17 years

National Immunization Survey-Teen, 2006–2010

FDA, Food and Drug Administration

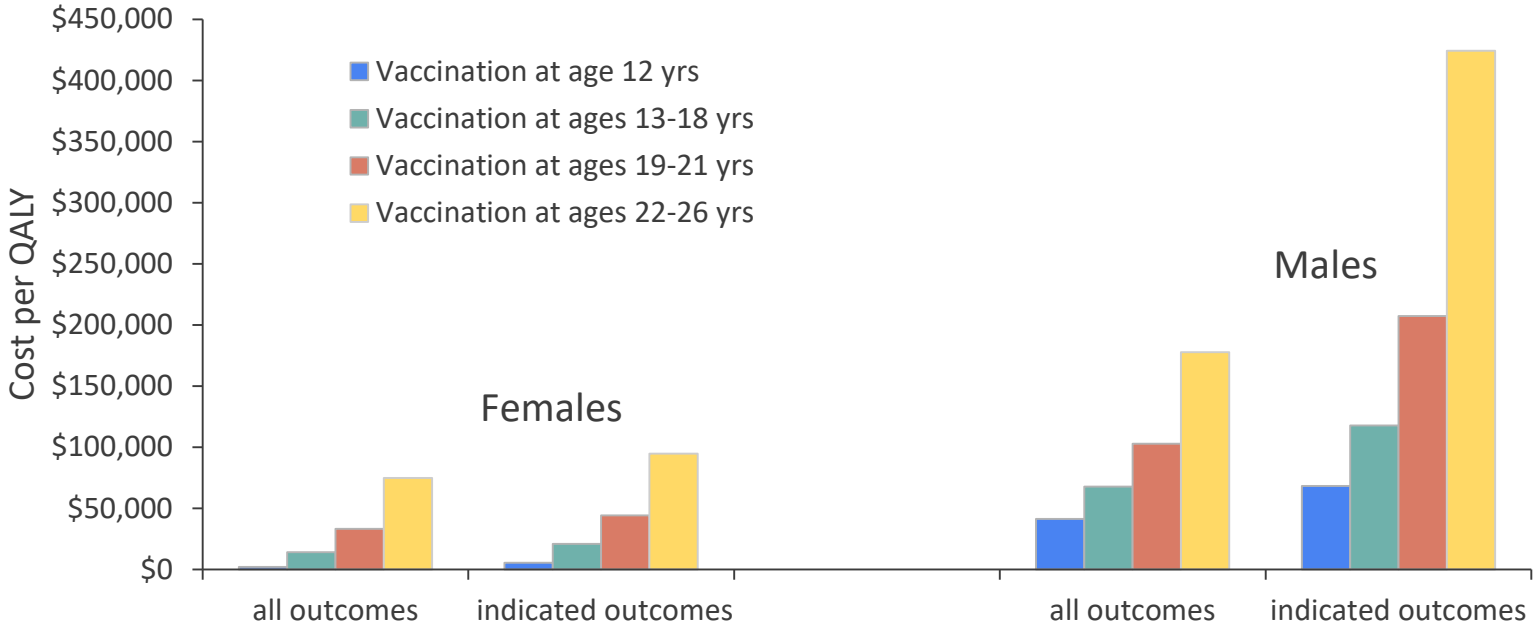
*Palefsky J, et al. NEJM 2011

Cost-effectiveness considerations for HPV vaccination of males, 2009-2011

- **Male vaccination less cost-effective than female vaccination**
  - Depends on health outcomes included in models
  - Depends on female vaccination coverage assumptions
- **Vaccination of men who have sex with men cost-effective through age 26 years**

Kim J and Goldie S, BMJ 2009; Chesson H, et al. Vaccine 2011; Kim J, Lancet Infect Dis 2010

Cost-effectiveness of routine and catch-up HPV vaccination, considerations in 2011



- Lower coverage scenario: 3-dose coverage 30% at age 12, 50% by age 26 years
- Vaccination of older age groups is incremental to vaccination of younger age groups. Results for male vaccination show incremental cost-effectiveness of expanding male vaccination to include additional age groups, in the context of an existing vaccine program for females aged 12-26 years.
- "Indicated" outcomes include cervical outcomes, vaginal, vulvar, and anal cancers, genital warts. All outcomes include indicated outcomes plus oropharyngeal cancer, penile cancer, and recurrent respiratory papillomatosis.

Adapted from Chesson, June 2011 ACIP (from model published in Vaccine 2011) QALY: quality-adjusted life year

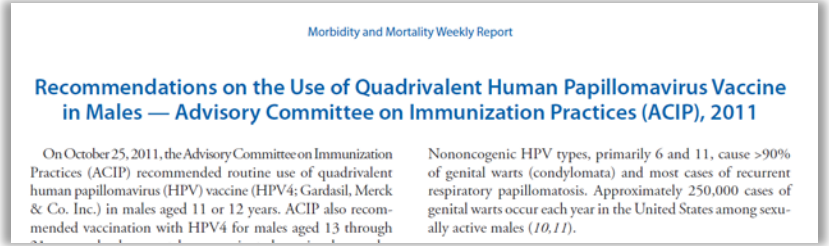
ACIP deliberations and conclusions: HPV vaccination of males, October 2011

- Quadrivalent HPV vaccine is safe/effective in males
- Burden of disease in males justifies routine vaccination; likely benefit against all HPV vaccine type-attributable disease
- Males as well as females should be protected against HPV: equity
- Vaccination of adolescent males is cost effective at current coverage levels
- In addition to protecting heterosexual males and their female sex partners, routine vaccination is the best way to reach MSM, and men with this sexual orientation, at an age when they could most benefit
- Higher cost per QALY for vaccination of 22–26 year-old males was a consideration for age recommendations for males

QALY, quality-adjusted life year

ACIP recommendations for HPV vaccination of males, 2011

- **Quadrivalent HPV vaccination of males was considered using GRADE**
  - Recommendation category A; evidence type 2
- **Recommendations for vaccination of males**
  - Routine at age 11 or 12 years; series can be started at age 9 years
  - Through 21 years if not vaccinated previously; 22–26 year-olds may be vaccinated
  - Through 26 years for high risk groups
- **United States was the first country to include routine vaccination of males in national immunization program**



Morbidity and Mortality Weekly Report

Recommendations on the Use of Quadrivalent Human Papillomavirus Vaccine in Males — Advisory Committee on Immunization Practices (ACIP), 2011

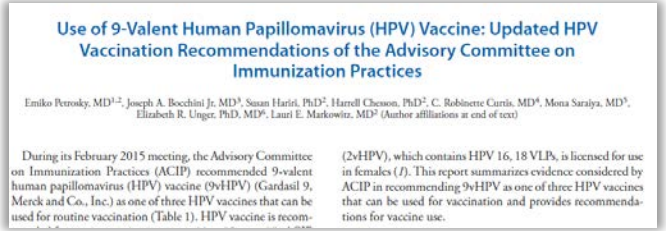
On October 25, 2011, the Advisory Committee on Immunization Practices (ACIP) recommended routine use of quadrivalent human papillomavirus (HPV) vaccine (HPV4; Gardasil, Merck & Co. Inc.) in males aged 11 or 12 years. ACIP also recommended vaccination with HPV4 for males aged 13 through

Nononcogenic HPV types, primarily 6 and 11, cause >90% of genital warts (condylomata) and most cases of recurrent respiratory papillomatosis. Approximately 250,000 cases of genital warts occur each year in the United States among sexually active males (*10,11*).

MMWR 2011;60

ACIP Recommendations for 9-valent HPV vaccine, 2015

- **FDA licensed 9-valent vaccine in 2014 for females and males**
  - Efficacy trial in females; immunobridging studies in females and males
- **ACIP considered 9-valent HPV vaccine using GRADE***
  - Vaccinating females and males with 9-valent vaccine estimated to be cost saving compared with 4-valent vaccine+
    - Modeling considered current policy for females and males
    - Did not reconsider age recommendations
  - Recommendation category A; evidence type 2 (females) and type 3 (males)



Use of 9-Valent Human Papillomavirus (HPV) Vaccine: Updated HPV Vaccination Recommendations of the Advisory Committee on Immunization Practices

Emiko Petrosky, MD[1,2], Joseph A. Bocchini Jr, MD[3], Susan Hariri, PhD[2], Harrell Chesson, PhD[2], C. Robinette Curtis, MD[4], Mona Saraiya, MD[5], Elizabeth R. Unger, PhD, MD[6], Lauri E. Markowitz, MD[2] (Author affiliations at end of text)

During its February 2015 meeting, the Advisory Committee on Immunization Practices (ACIP) recommended 9-valent human papillomavirus (HPV) vaccine (9vHPV) (Gardasil 9, Merck and Co., Inc.) as one of three HPV vaccines that can be used for routine vaccination (Table 1). HPV vaccine is recom- (2vHPV), which contains HPV 16, 18 VLPs, is licensed for use in females (*1*). This report summarizes evidence considered by ACIP in recommending 9vHPV as one of three HPV vaccines that can be used for vaccination and provides recommendations for vaccine use.

MMWR 2015;64

*https://www.cdc.gov/vaccines/acip/recs/grade/hpv-9v.html

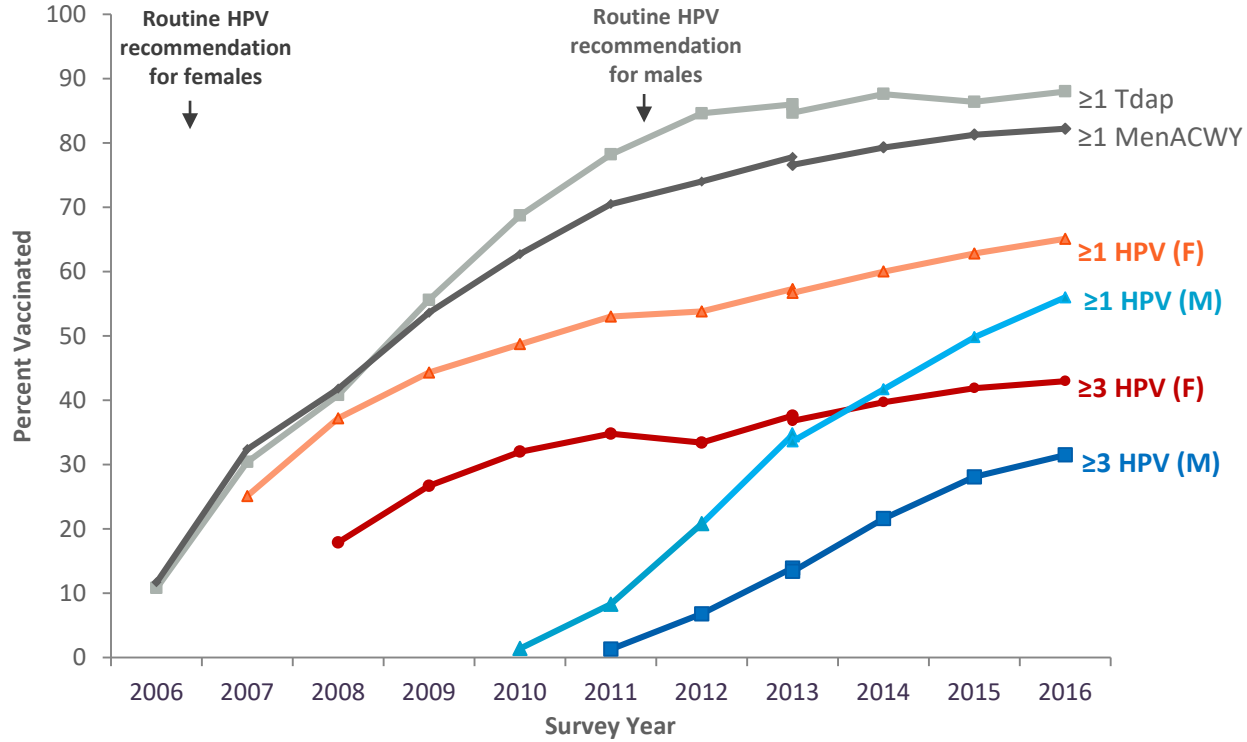
+Brisson M et al. JNCI 2015

FDA , Food and Drug Administration

Considerations for harmonization of upper age recommendations for females and males

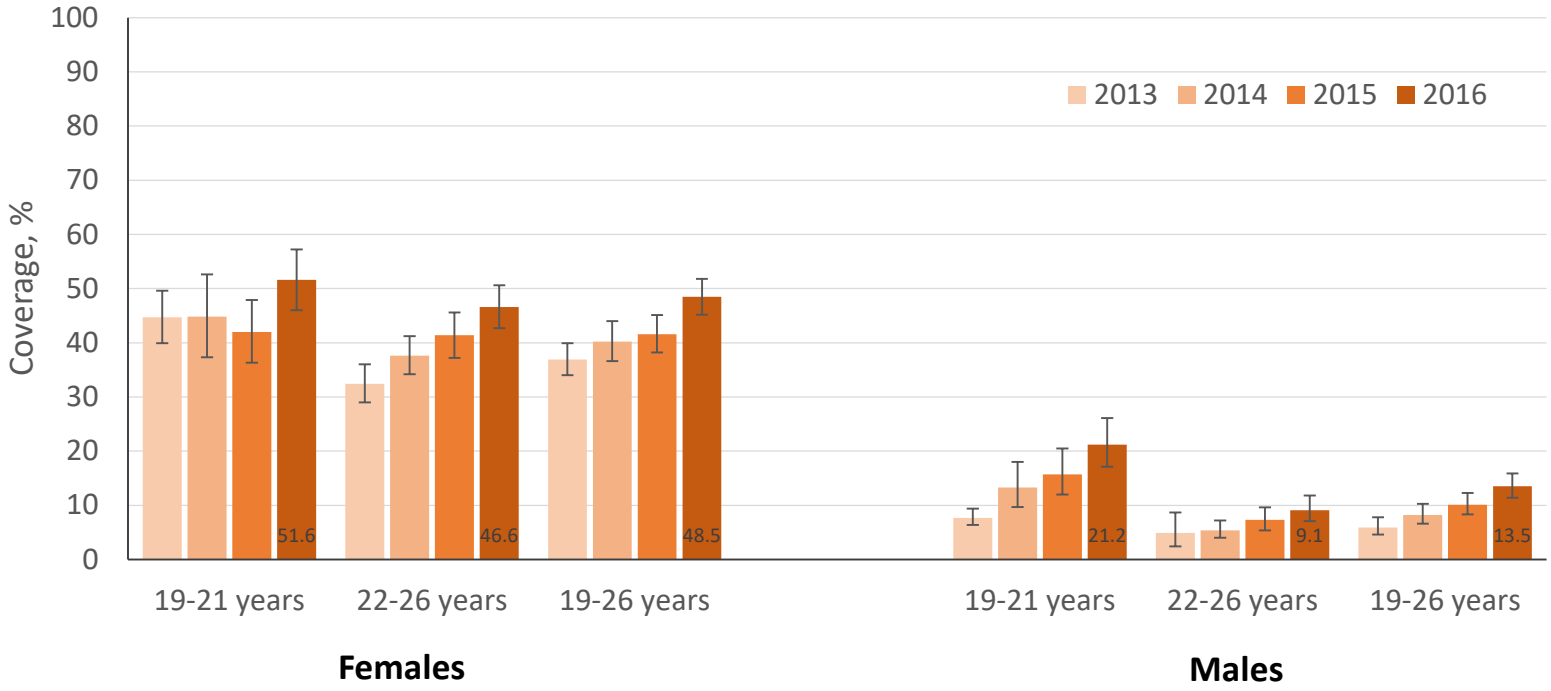
- Would simplify immunization schedule
- Might facilitate reaching males, including high risk males

Estimated vaccination coverage among adolescents aged 13–17 years, NIS-Teen, United States, 2006–2016



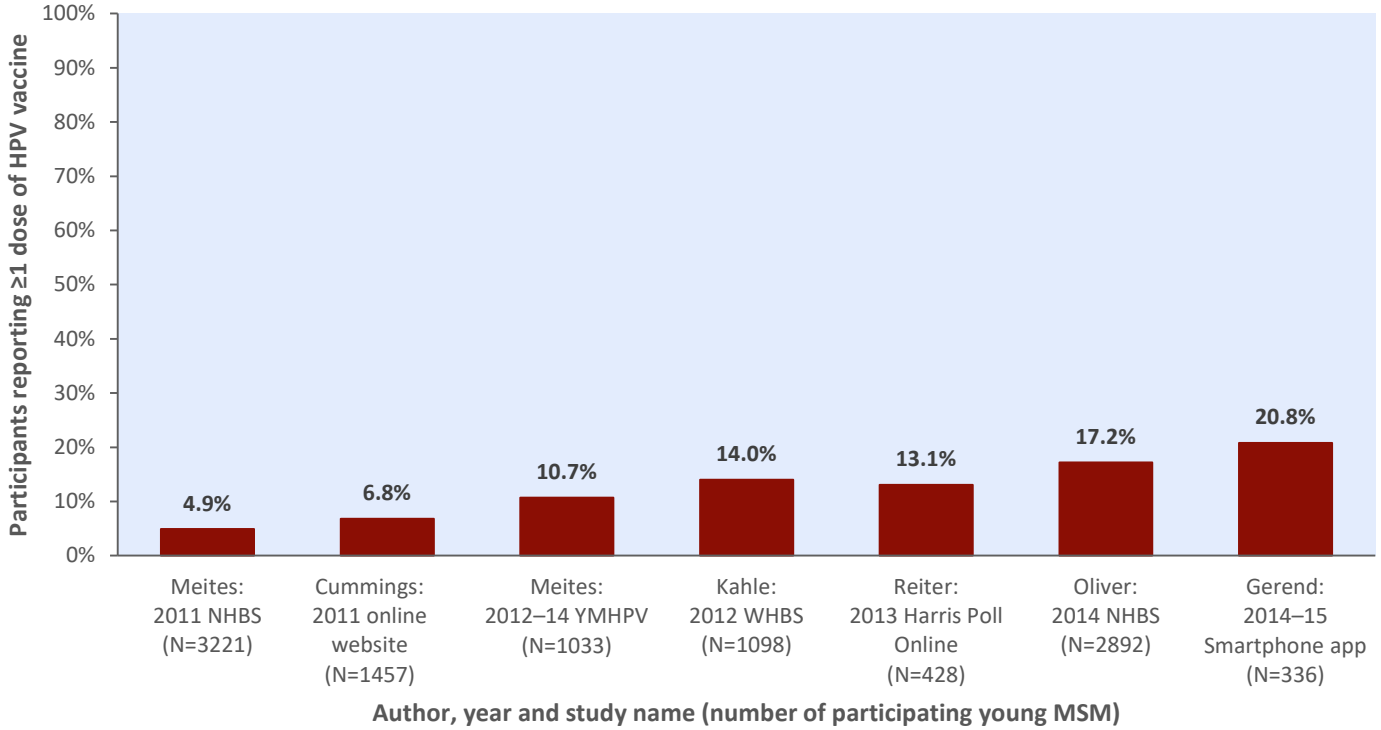
Walker T, et al. MMWR 2017; 66 NIS-Teen, National Immunization Survey-Teen; Note: revised definition of adequate provider data in 2013

Estimated ≥1 dose HPV vaccination coverage among 19–26 year-olds, 2013–2016



Self-reported vaccination history from NHIS, National Health Interview Survey
Williams W, et al. MMWR 2017; Hung MC, et al. https://www.cdc.gov/vaccines/imz-managers/coverage/adultvaxview/NHIS-2016.html

HPV vaccination coverage among men who have sex with men (MSM), ages 18–26 years, 2011–2015



Meites E and Markowitz LE, slide presented at IPV Conference, 2017

NHBS, National HIV Behavior Surveillance; WHBS, Web-based HIV Behavioral Survey among Men Who Have Sex with Men

Next steps for consideration of harmonization of age recommendations for females and males

- Review burden of disease and HPV epidemiology in males (today)
- Summarize vaccine efficacy data in males
- Values and acceptability surveys regarding the age harmonization policy
  - Primary care providers
  - Association of Immunization Managers
- Updated cost effectiveness analysis
  - Extending 9vHPV for males from age 21 to 26 years in context of a 9-valent HPV vaccination program, under current vaccination coverage and costs
- Synthesize using Evidence to Recommendations Framework
- Potential vote in 2018

Presentations today

- **Trends in HPV-associated cancers**
  - Dr. Elizabeth Van Dyne (CDC/NCCDPHP)
- **Epidemiology of HPV in males**
  - Dr. Anil Chaturvedi (NIH/NCI)

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Thank You

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